QuadraTherm® qMix RealTime Flare Measurement System

Gas Analysis System for Accurately Measuring Gas Flow with Changing Compositions and Conditions

Instruction Manual

qMix RealTime Flare Measurement System
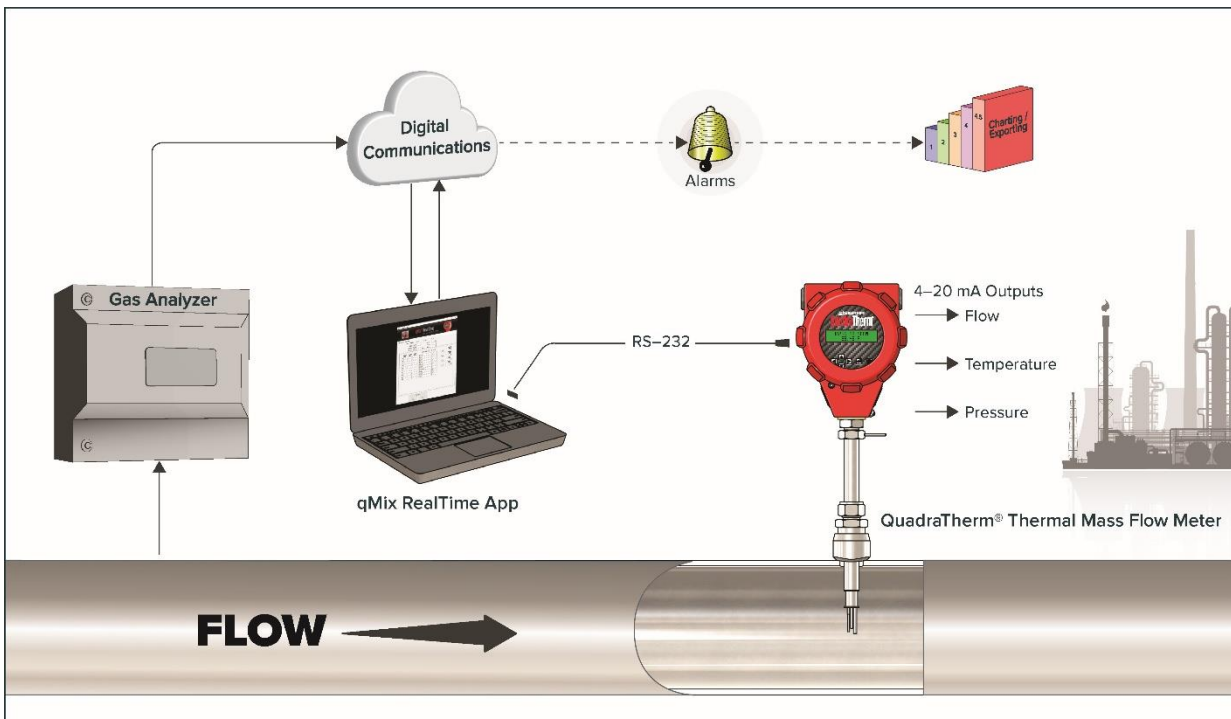IM-qmixRealTimeFMS Rev.V1
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SIERRA®

Table of Contents

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qMix RealTime Flare Measurement System (FMS)

The QuadraTherm® qMix RealTime Flare Measurement System is a complete system for accurately measuring gas flow in a process with changing compositions and conditions. qMix RealTime FMS enables real-time, accurate gas flow measurement, even when your composition changes. qMix RealTime FMS adjust to changing gas mixtures and percentages within seconds - no recalibration needed.

There are three major components to this system:

- QuadraTherm® 640i/780i Thermal Mass Flow Meter
- qMix RealTime Software Application
- Window-based laptop computer (included)

Get Started-Create Gas Composition Using qMix RealTime FMS System

1. Install the QuadraTherm meter and your existing gas analyzer or gas chromatograph, then connect both to the provided PC laptop that will be running qMix RealTime software (factory loaded).
   a. The meter uses RS-232 for communications.
   b. The attached laptop communicates with backend composition data using Modbus RTU.
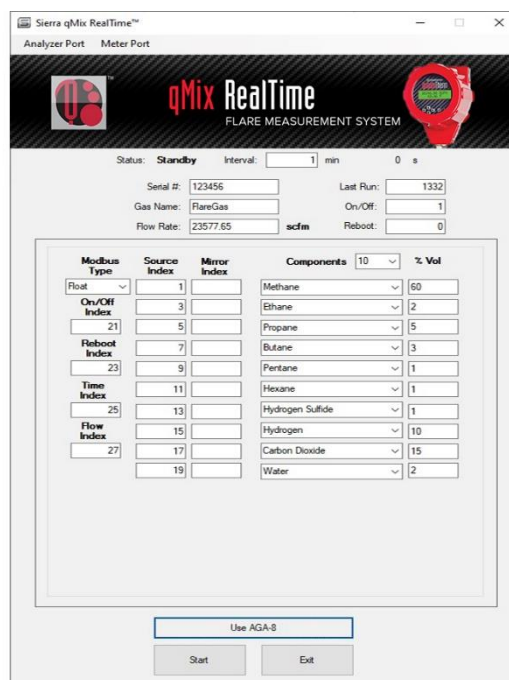2. Open qMix RealTime Flare Measurement Software application on the PC. View the main menu.

Figure 1. qMix RealTime App-Main Menu

3. In the main menu, select the number of components in the process gas composition from the "Components" dropdown menu.

Use "Components" drop down to select number of components.

4. Choose the correct gas for each of your components from the dropdown menus.

The number of rows which indicates gas type depends on the number of components chosen.

5. In the main menu, select the Modbus register type under "Modbus Type" for all of the components from the dropdown menu.

6. Enter the Modbus address for each component in the "Source Index" fields.

Source Index	Mirror Index
1	
3	
5	
7	
9	
11	
13	
15	
17	
19	

7. (Optional Step) To assure correct composition was written to the meter, the current meter composition can be written to mirror registers and verified. Enter the Modbus address for each Mirror register in the "Mirror Index" fields.

Source Index	Mirror Index
1	
3	
5	
7	
9	
11	
13	
15	
17	
19	

Enter Modbus address for each mirror register in the "Mirror Index" column.

8. (Optional Step) To allow for remote control of the qMix RealTime process, select a Modbus register type and enter a Modbus address in the "On/Off Index" field.

   a. With a value of one (1), the qMix RealTime process runs.
      1= On/Start
   b. With a value of zero (0), the qMix RealTime process pauses.
      0=Off/Stop

On/Off Index	
21	On/Off: 1

9. (Optional Step) To allow for remote reboot of the meter, select a Modbus register type and enter a Modbus address in the "Reboot Index" field.
    a. When set to a value of one (1), the QuadraTherm meter reboots.
    b. The value is returned to zero (0) following a successful reboot.

Reboot Index		
23	Reboot:	0

10. (Optional Step) To allow for tracking last run time of the qMix RealTime process, select a Modbus register type and enter a Modbus address in the "Time Index" field.

⚠	Note: The value is the last process run time recorded in a 24-hour format.

Time Index		
25	Last Run:	1332

11. (Optional Step) To allow for tracking the flow rate of the QuadraTherm meter, select a Modbus register type and enter a Modbus address in the "Flow Index" field.
   a. The value is the current meter flow rate.

Flow Index			
27	Flow Rate:	30534.85	scfm

12. Once the Modbus register setup is complete, connection to the gas analyzer is possible.
    a. Click on the tab labeled "Analyzer Port" and a dialog window will appear.
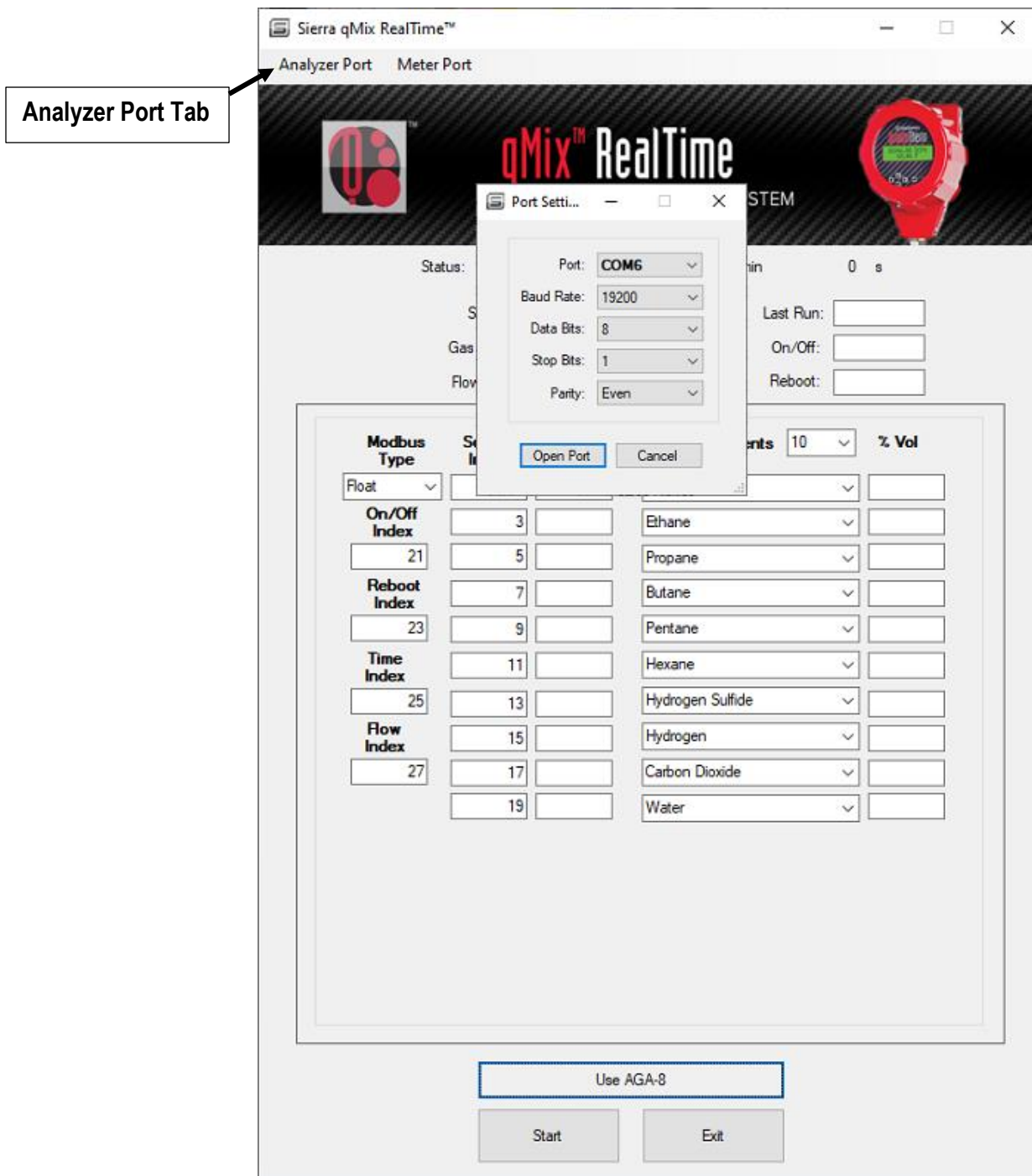

b. Select the COM port, "Baud Rate," "Data Bits," "Stop Bits," "Parity"
c. Click the "Open Port" button once the correct settings have been entered.

13. Once the gas analyzer is connected, the process composition values will begin to populate. Any active optional Modbus registers will also populate.
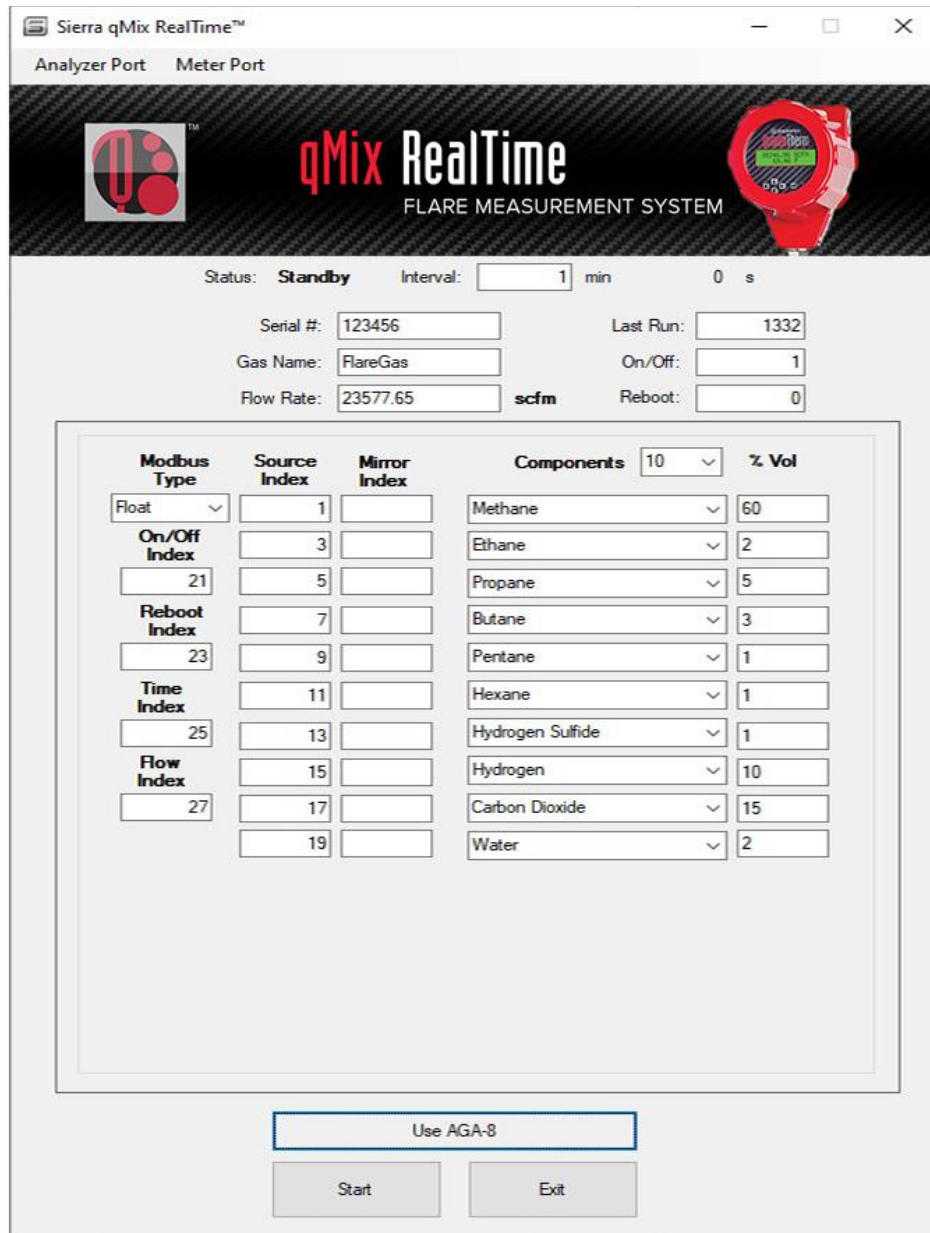
14. Click on the "Meter Port" tab to open a dialog for connecting to the QuadraTherm meter.
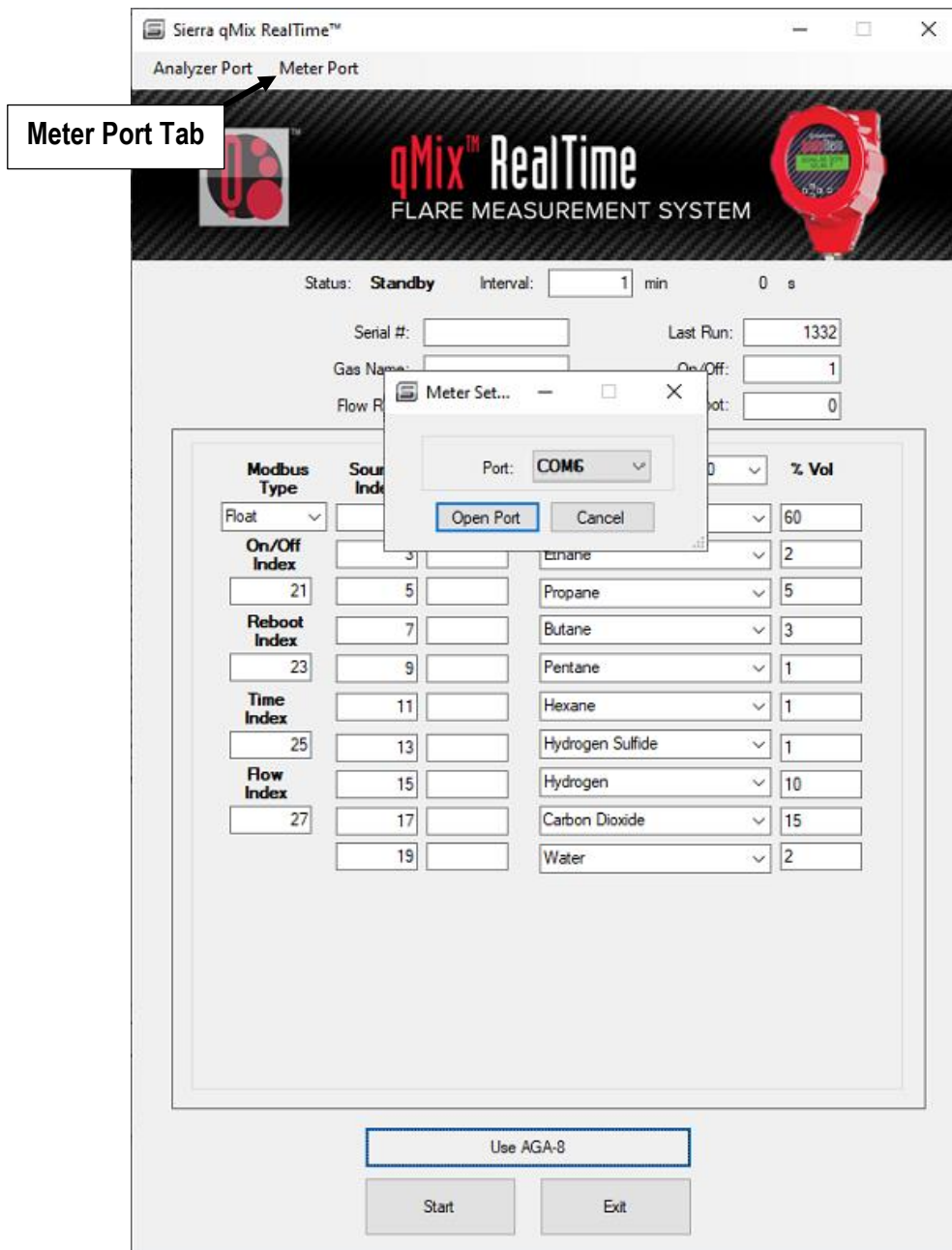
15. Select the meter COM Port by using the "Port" pull down menu and click the "Open Port" button.

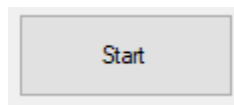16. Once you click, "Open Port," the meter's "Serial #," "Gas Name," and "Flow Rate" units will populate.

17. Now, select the time interval (in minutes) that you would like to run the qMix RealTime process on.

18. (Optional) If you would prefer to use the AGA-8 density values for hydrocarbons, click the "Use AGA-8" button.
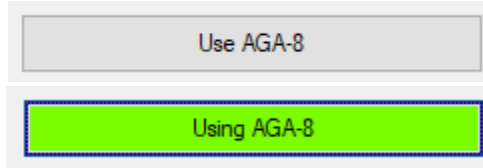
19. To begin the qMix RealTime process, click the "Start" button.

20. Once the process is started, the following steps are repeated:
    a. A gas mixture is generated from the current process composition.
    b. The meter calibration is updated with values representing this gas mixture.
    c. The meter flow rate adjusts to account for the updated gas mixture.
    d. After loading is complete, a countdown begins based on the interval.
    e. When the countdown completes, a new gas mixture is generated, and these steps repeat.
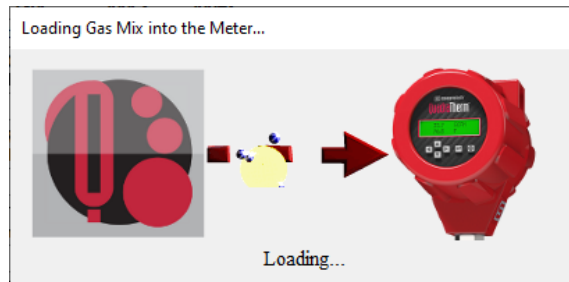
21. The qMix RealTime process will continue until the "Stop" or "Exit" button is pushed or a remote "On/Off" Modbus command is received.

    a. The "Stop" button will pause the process until "Start" is clicked again.
    b. The "Exit" button will completely close the qMix RealTime software application.
    c. The "On/Off" Modbus command will pause the qMix RealTime process while set to a value of zero (0).